

Name: \_\_\_\_\_

### at1121exam\_practice: Radicals and Completing Squares (v0)

#### Question 1

Simplify the radical expressions.

$$\sqrt{75}$$

$$\sqrt{12}$$

$$\sqrt{99}$$

$$\sqrt{5 \cdot 5 \cdot 3}$$

$$5\sqrt{3}$$

$$\sqrt{2 \cdot 2 \cdot 3}$$

$$2\sqrt{3}$$

$$\sqrt{3 \cdot 3 \cdot 11}$$

$$3\sqrt{11}$$

#### Question 2

Find all solutions to the equation below:

$$\frac{(x - 6)^2 + 7}{8} = 7$$

1. multiply by 8
2. subtract 7

$$(x - 6)^2 = 49$$

$$x - 6 = \pm 7$$

$$x = 6 \pm 7$$

So the two solutions are  $x = 13$  and  $x = -1$ .

### Question 3

By completing the square, find both solutions to the given equation:

$$x^2 - 8x = 9$$

$$x^2 - 8x + 16 = 9 + 16$$

$$x^2 - 8x + 16 = 25$$

$$(x - 4)^2 = 25$$

$$x - 4 = \pm 5$$

$$x = 4 \pm 5$$

$$x = 9 \quad \text{or} \quad x = -1$$

### Question 4

Quadratic polynomial  $p$  is defined below in standard form.

$$p(x) = 2x^2 - 12x + 12$$

Express the polynomial in **vertex form** and identify the location of the vertex.

From the first two terms, factor out 2 .

$$p(x) = 2(x^2 - 6x) + 12$$

We want a perfect square.

$$p(x) = 2(x^2 - 6x + 9 - 9) + 12$$

Factor the perfect-square trinomial.

$$p(x) = 2((x - 3)^2 - 9) + 12$$

Distribute the 2.

$$p(x) = 2(x - 3)^2 - 18 + 12$$

Combine the constants to get **vertex form**:

$$p(x) = 2(x - 3)^2 - 6$$

The vertex is at ( 3 , -6 ).